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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/812,765

03/29/2004

Norihiro Arai

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1933 7590 07/11/2007  
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EXAMINER

CHEN, WEN YING PATTY

ART UNIT

PAPER NUMBER

2871

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/812,765	<b>Applicant(s)</b> ARAI ET AL.	
	<b>Examiner</b> W. Patty Chen	<b>Art Unit</b> 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 8 and 10-18 is/are pending in the application.
- 4a) Of the above claim(s) 2, 4, 5 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 8, 10, 11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Apr. 6, 2007 has been entered.

### ***Response to Amendment***

The Amendment filed on Mar. 12, 2007 has been entered. Claims 6 and 7 are cancelled, therefore, claims 1-5, 8 and 10-18 remain pending in the current application. However, claims 2, 4, 5 and 12 are withdrawn from consideration.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 8, 10-11 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (US 6614496) in view of Fujimori et al. (US 2003/0063244) further in view of Baek (US 2002/0041351) further in view of Sakamoto et al. (US 7015996).

With respect to claims 1 and 17 (Amended): Song et al. disclose in Figures 5, 6 and 9 a liquid crystal display device comprising:

a liquid crystal element comprising:

a front substrate (element 106) which is arranged at a front side of the liquid crystal element, which corresponds to a viewing screen side of the display device;

a back substrate (element 108) which is arranged at a back side of the front substrate so as to be opposed to the front substrate;

at least one thin film transistor (element T) which is arranged on the internal surface of the back substrate and driven by a drive signal;

at least one second electrode (element 70) which comprises a transparent conductive film arranged on the internal surface of the back substrate so as to be opposed to the at least one first electrode, and is connected to the thin film transistor (through element 66), thereby forming at least one pixel in an area where the at least one first electrode and the at least one second electrode are opposed to each other;

a liquid crystal layer (element 100), comprising liquid crystal molecules, which is sandwiched between the front substrate and the back substrate;

at least one reflective film (element 68), which is positioned between the second electrode and the internal surface of the back substrate (as shown in Figure 6D) so as to correspond to a part of the at least one pixel, respectively, such that a reflective portion for reflecting incident light and a transmissive portion (element 72), in a region other than the reflective portion, for transmitting incident light are formed in the at least one pixel;

a color filter (element 104) which is provided on the internal surface of the front substrate so as to correspond to the at least one pixel;

a front polarizing plate and a back polarizing plate which are arranged at the front side and a back side of the liquid crystal element, respectively (Column 7, lines 2-6); and

a backlight (element 102) which is arranged at a back of the back polarizing plate.

Song et al. fail to disclose that at least one first electrode formed on the internal surface of the front substrate and that an opening is formed by removing the color filter at a position such that the opening corresponds to a part of the reflective portion, and that a liquid crystal layer thickness adjusting layer is provided in at least a region corresponding to the reflective portion between the front substrate and the back substrate, in order to set a thickness of the liquid crystal layer in the reflective portion to be thinner than a thickness of the liquid crystal layer in the transmissive portion and that a pair of retardation plates of  $\frac{1}{4}$  wavelength and further that the liquid crystal molecules being twist-aligned by an angle in a range of  $60^\circ$  to  $70^\circ$ .

However, Fujimori et al. disclose in Figure 16 a liquid crystal display device comprising one first electrode (element 46) formed on the internal surface of the front substrate and a color filter (element 42) at a position such that the opening (element 42') corresponds to a part of the reflective portion, and that a liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2', having diffusion properties) is provided in at least a region corresponding to the reflective portion between the front substrate and the back substrate, in order to set a thickness of the liquid crystal layer (element 50) in the reflective portion to be thinner than a thickness of the liquid crystal layer in the transmissive portion. Further, Baek discloses in Figure 6 a transfective display device comprising of front and rear retardation plates (elements 142 and 145) of  $\frac{1}{4}$  wavelength and respectively arranged between a front and a rear polarizing plates (elements 152 and 155) and the liquid crystal layer, wherein the slow axes of the retardation plates are perpendicular to each other (Paragraph 0081) and still further, Sakamoto et al. teach in Column 13 lines 23-26 the use of a liquid crystal layer in a transfective display device wherein the liquid crystal molecules being twist-aligned by an angle of  $60^\circ$ .

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Song et al. wherein the at least one first electrode is formed on the internal surface of the front substrate and that the color filter comprises of openings corresponding to the reflective region in which a thickness adjusting layer is provided on the color filter corresponding to the openings such that the thickness of the liquid crystal layer at the reflective region is thinner than a thickness of the liquid crystal layer in the transmissive region as taught by Fujimori et al., since Fujimori et al. teach that in order to produce an active matrix type LCD device, a first electrode must be formed on the opposing substrate as the pixel electrode (Paragraph 0062) and that by forming the color filter have such characteristics the scattering of the light at the reflection portion can be enhanced (Paragraph 0146) and wherein  $\frac{1}{4}$  wavelength retardation plates are arranged between the liquid crystal layer and the front and rear polarizing plates as taught by Baek, since Baek teaches that such configuration of the polarizing plates and the retardation plates help to prevent light leakage when displaying the dark state of the LCD device (Paragraph 0081) and further wherein the liquid crystal molecules being twist-aligned by an angle of  $60^\circ$  as taught by Sakamoto et al., since Sakamoto et al. teach that such twist of the liquid crystal molecules helps to reduce color shift when viewing from a position inclined relative to the direction normal to the display face (Column 13, lines 49-62).

As to claims 3: Fujimori et al. further disclose in Figure 16 that a thickness of the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') is set such that a thickness of the color filter (element 42) in the reflective portion is equal to a thickness of the color filter in the transmissive portion.

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As to claim 8: Fujimori et al. further disclose in Paragraph 0146 that the liquid crystal layer thickness adjusting layer comprises a transparent insulation film.

As to claim 10: Fujimori et al. further disclose in Figure 16 that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42).

As to claim 11: Fujimori et al. further disclose in Figure 16 that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42) and covers the color filter.

As to claim 18: Fujimori et al. further disclose in Figure 16 that a thickness of the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') is set such that a thickness of the color filter (element 42) in the reflective portion is equal to a thickness of the color filter in the transmissive portion and that the liquid crystal layer thickness adjusting layer (elements 44a1' and 44a2') fills the hole (element 42') formed in the color filter (element 42) and covers the color filter.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (US 6614496), Fujimori et al. (US 2003/0063244), Baek (US 2002/0041351) and Sakamoto et al. (US 7015996) in view of Ha (US 2003/0160914).

The prior arts disclose all of the limitations set forth in claim 1, but failed to disclose that the reflective layer comprises a reflective surface on which depressions and protrusions are formed.



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However, Ha discloses in Figure 4 a liquid crystal display device comprising a reflective layer (element 19b), which comprises a reflective surface on which depressions and protrusions are formed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by the prior arts wherein the reflective layer comprises a reflective surface on which depressions and protrusions are formed as taught by Ha, since Ha teaches that the uneven reflective surface results in minimized specular reflection and improves diffusion of incident light (Paragraph 0025).

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (US 6614496), Fujimori et al. (US 2003/0063244), Baek (US 2002/0041351) and Sakamoto et al. (US 7015996) in view of Ozawa et al. (US 2004/0004681).

With respect to claim 14: The prior arts disclose all of the limitations set forth in claim 1, but failed to specifically disclose that the liquid crystal layer in the reflective portion exhibits a retardation of  $\frac{1}{4}$  wavelength and the transmissive portion exhibits a retardation of  $\frac{1}{2}$  wavelength to a light transmitted through in the non electric field state.

However, Ozawa et al. disclose in the Abstract a transreflective liquid crystal display device wherein in transmissive display regions and the reflective display regions are set to a  $\frac{1}{2}$  wavelength and a  $\frac{1}{4}$  wavelength respectively, with no voltage applied.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by the prior arts wherein the liquid crystal layer in the reflective portion exhibits a retardation of  $\frac{1}{4}$  wavelength

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and the transmissive portion exhibits a retardation of  $\frac{1}{2}$  wavelength to a light transmitted through in the non electric field state as taught by Ozawa et al., since Ozawa et al. teach that with such configuration of the liquid crystal layer an improved display brightness in the transmission mode and an excellent visibility can be achieved (Abstract).

As to claim 15: Baek further discloses in Paragraph 0081 that the front polarizing plate and the back polarizing plate are arranged such that the transmission axes thereof are orthogonal to each other; and

wherein the front retardation plate is arranged so as to cancel the retardation provided to the light transmitted therethrough by the liquid crystal layer in the non electric field state.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. (US 6614496), Fujimori et al. (US 2003/0063244), Baek (US 2002/0041351), Sakamoto et al. (US 7015996) and Ozawa et al. (US 2004/0004681) in view of Iijima (US 2002/0154257),

The prior arts disclose all of the limitations set forth in the previous claims, but failed to disclose that a scattering reflective plate is arranged between the front polarizing plate and the liquid crystal layer.

However, Iijima further discloses in Figure 20 a scattering reflective plate (element 16) arranged between the front polarizing plate (element 13) and the liquid crystal layer (element 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by the prior arts wherein a scattering reflective plate is arranged between the front polarizing plate and the liquid crystal

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layer as taught by Iijima, so that the image light of the display is uniformly scattered towards the viewer.

### ***Response to Arguments***

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Patty Chen whose telephone number is (571)272-8444. The examiner can normally be reached on 8:00-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571)272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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W. Patty Chen

Examiner

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WPC

7/06/07

  
ANDREW SCHECHTER  
PRIMACY EXAMINER